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AMENDMENTS TO THE SPECIFICATION:

At page 4, please delete lines 17 through 20 and insert in its place, the following:

FIGS 6A THROUGH 6G are graphs showing dark and light I-V curves for the 7 cells shown on a substrate 1x1.5in². The film were subjected to evaporant species from zinc acetate dihydrate at 150⁰C, followed by sputter deposition of ZnO. Each figure is for one cell, and the two lines are for dark and light I-V.

At page 5, delete lines 22 through 25 and insert:

Equivalents of zinc acetate dihydrate in the context of the invention process are zinc chloride, zinc iodide, and zinc bromide. Further, cadmium chloride, cadmium iodide, and cadmium bromide will produce effects similar to that of the aforementioned zinc compounds.

At page 7, delete lines 12 through 15 and insert:

FIG. 6 is a graph showing dark and light I-V curves for the 7 cells shown on a substrate 1x1.5in² shown in FIGS. 6A thru 6G. The film were subjected to evaporant species from zinc acetate dihydrate at 150⁰C, followed by sputter deposition of ZnO. Each figure is for one cell, and the two lines are for dark and light I-V.

Please remove blurred page 2 and replace it with the clear copy of currently submitted page 2. Contrary to the assertions made in the Office Action, it is apparent that an obscure or blurred copy of the originally filed application was received – therefore, replacing the entire page is believed permitted in the regulations, that is – to remove the blurred page in favor of a clear page, and this does not change the context of the application at all.

Nevertheless, in the event that it is insisted that Applicants replace the paragraph starting on page 1 at line 29 through the paragraph starting at page 2 line 23 as maintained in the Office Action, Applicants have attached herewith the replacement paragraphs, as follows:

"While various improvements have been made in the manufacture of copper indium diselenide CdS cells, several complications remain. For example, chemical bath deposition of cadmium sulfide is used to produce the highest efficiency devices. However, this step involves a slow wet chemical step inconsistent with an otherwise in-line dry fabrication process. Moreover, cadmium and thiourea are highly toxic materials which escalate manufacturing costs as a result of the handling and disposal of these hazardous waste materials".

Several attempts to avoid handling complications inherent in the use of CdS are disclosed in "A ZnO/p-CuInSe₂ Thin Film Solar Cell Prepared Entirely by Spray Pyrolysis," M.S. Tomar and F.J. Garcia, Thin Solids Films, 90 (1982), p.419-423; and "Chemical Vapor Deposited Copper Indium Diselenide Thin Film Materials Research" Final Report, March 1984, SERI/STR-211-2247. Although these publications disclose copper indium diselenide/zinc oxide heterojunction formation using zinc oxide spray pyrolysis or ion beam sputtering respectively, neither method results in an efficiency of greater than 2-3%. Accordingly, these publications do not disclose a commercially viable method for the replacement of CdS with zinc oxide in a thin film copper indium diselenide heterojunction cell.

U.S. Pat. No. 4,612,411, describes the preparation of a thin film heterojunction photovoltaic cell formed from copper indium diselenide, as a first semiconductor layer, and the formation of a two layer, zinc oxide semiconductor in heterojunction with the copper indium diselenide. The first of the two zinc oxide layers comprises a relatively thin layer (100-2000 angstroms) of high resistivity zinc oxide and the second comprises a relatively thick (10,000 angstroms) zinc oxide layer doped to exhibit low resistivity.

U.S. Pat. No. 5,474,939, produces a higher efficiency non-CdS cell through the application of a wet chemical deposition zinc hydroxide precipitation step. This process involves

the use of a metal back contact having a first p-type semiconductor film of chemical vapor deposition ("CVD") copper indium diselenide and a second transparent n-type semiconductor film of CVD zinc oxide on the copper indium diselenide and a thin interfacial film of transparent insulating zinc oxide, between the p-type copper indium diselenide film and the n-type zinc oxide. The interfacial zinc oxide film is prepared by chemical deposition of zinc hydroxide on the copper indium diselenide from a zinc salt solution and complexing agents comprising ammonium hydroxide or triethanolamine, to form a zinc ammonium solution complex, and annealing the deposit to convert the zinc hydroxide into the zinc oxide. While this patent uses a wet chemical deposition step of zinc hydroxide precipitate from solution to generate a thin interfacial zinc oxide layer, the devices prepared by direct deposition of a zinc oxide layer, the devices prepared by direct deposition of a zinc oxide layer on copper indium diselenide films are only 2-4% conversion efficient in spite of utilizing films capable of producing 15-17% cells.

The specification was objected to on allegations of failing to provide proper antecedent basis for the claimed subject matter as recited in Claim 1. To contend with this allegation, on page 6, please delete lines 11 through 16 and replace same with the following paragraph:

The zinc acetate dihydrate source temperature was raised slowly and the charge was evaporated slowly, while the substrate is brought to the desired temperature before the evaporation is started. The substrate was exposed during the entire time. The exposure time was not controlled, and the evaporation lasted for about 2 to about 4 minutes. The samples were removed and etched in acetic acid in an amount of about 50% by volume in water to remove the ZnO deposit. Sputtered ZnO was deposited next in MRC.